Three-dimensional seismic geomorphology of paralic channel systems, Sable Sub-basin, offshore Nova Scotia, Canada

TREVOR B. KELLY AND GRANT D. WACH

Department of Earth Sciences, Dalhousie University, Halifax, Nova Scotia B3H 4R2, Canada
<tbkelly@dal.ca>

Large fluvial systems drained vast areas of Canada during the Late Jurassic to Late Cretaceous and deposited kilometres of sediment within the Scotian Basin, offshore Nova Scotia. These fluvial systems are prominent within the Logan Canyon Formation and to a lesser extent, the Missisauga Formation and can be imaged in the Sable Sub-basin within the Sable Megamerge 3-D seismic dataset. The key objective of this study is to examine the temporal and spatial fluvial system architecture variations, together with an assessment of the controlling features that are influencing this variability. This will be accomplished by integrating seismic geomorphology and sequence stratigraphy within the 3000 km^2 study area located offshore Nova Scotia. The seismic volume will be flattened on two surfaces, one representing the Logan Canyon Formation and the other representing the Missisauga Formation. The flattening process converts the seismic data into a stack of seismic horizon slices, showing the sedimentary features as they would have been deposited. Seismic attributes will be applied such that the horizon slice images containing the fluvial systems and their associated elements become more distinct. These horizon slices will be paired with quantitative seismic geomorphology to obtain fluvial architecture parameters (channel width (CW), channel thickness (CT), meander-belt width (MBW), radius of curvature (RC), meander wavelength (ML), channel length (CL), channel depth (CD), and sinuosity (SI)). These parameters will be used to help determine the main objective mentioned earlier with respect to the Logan Canyon and Missisauga formations. Core and well logs will 'ground truth' the seismic data. A qualitative analysis of the fluvial systems within the study intervals will include describing the fluvial styles present and the lateral spacing between channels. Characterizing these fluvial systems will help to: (1) understand the possible controlling factors and processes that lead to their creation and evolution, (2) refine the existing knowledge of reservoir heterogeneity within the Sable Sub-basin, (3) discern the relative time for each stratigraphic cycle that can be detected, and (4) construct a database of the geometries and dimensions of the fluvial channel bodies occurring in the study area/time interval for subsequent reservoir modelling.

Atlantic Geology, 2018, Volume 54
Atlantic Geoscience Society Abstracts – 44th Colloquium & Annual General Meeting 2018
doi: 10.4138/atlgeol.2018.003